

ABSTRACT OF THE DISCLOSURE

This invention relates to methods and compositions of an optochemical absorption and fluorescence sensing of materials for molecular identification and measuring the concentration of one or more analytes in the sample. The methods and compositions of an enhanced absorption and fluorescence multibands of a molecule by surface plasmon resonance of metal nanoparticles are described. The invention expands the analytical capacity of conventional, single-band absorption and fluorescence spectroscopy and sensing through implementation of the method of enhanced multi-band absorption and fluorescence of higher excited states (HES) and lowest excited state (LES) of the same molecule when the molecule is in close proximity to metal nanoparticles. The method provides a band-selective enhancement of a low quantum yield emission of HES fluorescence that leads to easy-to-detect multi-band fluorescence.